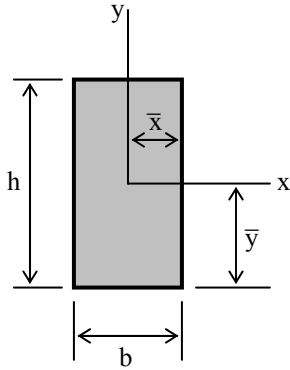


## APPENDIX C – Properties of Common Geometric Shapes

**Rectangle** (origin of axes at centroid)



$$A = bh$$

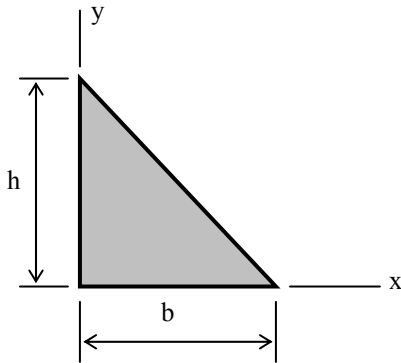
$$\bar{x} = \frac{b}{2}$$

$$\bar{y} = \frac{h}{2}$$

$$I_x = \frac{bh^3}{12}$$

$$I_y = \frac{hb^3}{12}$$

**Right Triangle** (origin of axes at vertex)

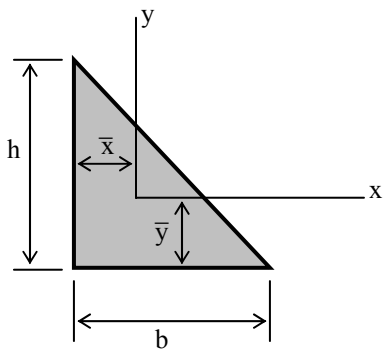


$$A = \frac{bh}{2}$$

$$I_x = \frac{bh^3}{12}$$

$$I_y = \frac{hb^3}{12}$$

**Right Triangle** (origin of axes at centroid)



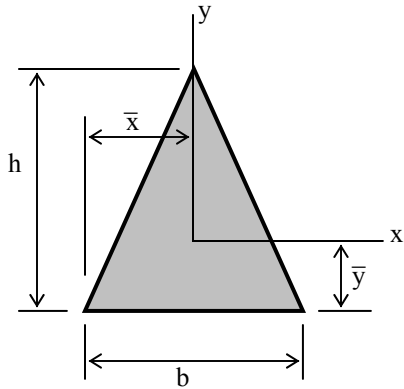
$$\bar{x} = \frac{b}{3}$$

$$\bar{y} = \frac{h}{3}$$

$$I_x = \frac{bh^3}{36}$$

$$I_y = \frac{hb^3}{36}$$

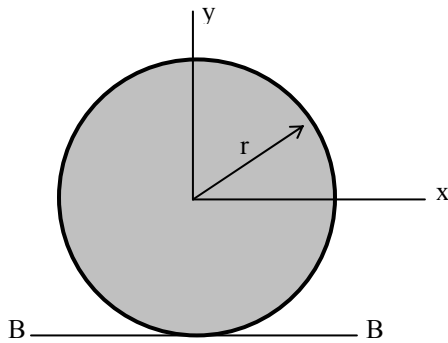
**Isosceles Triangle** (origin of axes at centroid)



$$A = \frac{bh}{2} \quad \bar{x} = \frac{b}{2} \quad \bar{y} = \frac{h}{3}$$

$$I_x = \frac{bh^3}{36} \quad I_y = \frac{hb^3}{48}$$

**Circle** (origin of axes at center)



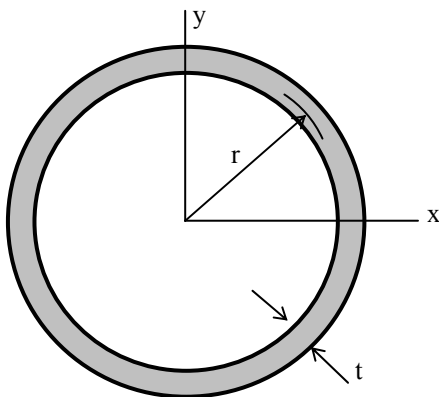
$$d = 2r \quad A = \pi r^2 = \frac{\pi d^2}{4}$$

$$I_x = I_y = \frac{\pi r^4}{4} = \frac{\pi d^4}{64}$$

$$I_{BB} = \frac{5\pi r^4}{4} = \frac{5\pi d^4}{64}$$

**Circular Ring with thickness “t”** (origin of axes at center)

Approximate formulas for the case when  $t$  is small



$$A = 2\pi r t = \pi d t$$

$$I_x = I_y = \pi r^3 t = \frac{\pi d^3 t}{8}$$